

PATENT ABSTRACTS OF JAPAN

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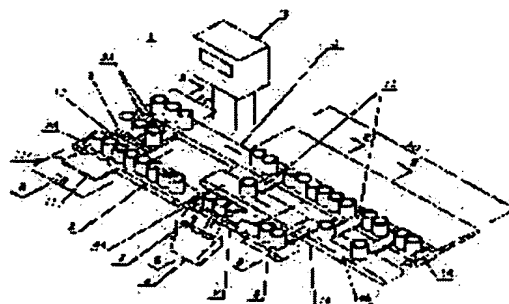
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(54) METERING METHOD AND DEVICE

(57)Abstract:

PURPOSE: To select and extract a proper combination of containers and to improve metering accuracy by loading an object to be metered into a metering container and performing metering/combination operation while moving the container flatly.

CONSTITUTION: Objects to be metered are successively loaded into an empty container on a conveyor 2. The same number of containers as balance single substances at a balance part 9 which are stopped by a stopper 2A are placed on the balance single substance 9A simultaneously by a platen 11 and the weight signal is transmitted to a control part/operation part 15. A conveyor 3 rotates in opposite direction from the conveyor 2 and the containers are pressed against a stopper 3B. An operation part 15 calculates a combination which is heavier and closest by the combination of one to four containers and operates a selection cylinder, thus pushing out the selected containers onto conveyors 4A and 4B. In the conveyors 4A and 4B, the containers are first brought to the center, are fed to a conveyor 5 by a platen 14, and further are fed to a conveyor 6. The containers are knocked down by a knock-down stand 7 on the conveyor 6 and only the objects to be metered are sent to a chute 8.



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CLAIMS

[Claim(s)]

[Claim 1] The measuring method which carries out a combination operation and is characterized by measuring or being constituted so that the container of the optimal combination may be chosen, sampled and packed while putting a measured object into a container for measuring and moving it superficially with this container.

[Claim 2] The 1st conveyor (2) which acts on a left from the method of the right, and the 2nd conveyor which acts on the method of the right from the left arranged in parallel to the 1st conveyor (2) (3), The 3rd conveyor which consists of the 3rd conveyor simple substance (4A, 4B) on either side which was arranged in parallel ahead of the abbreviation front side one half part (3D) of the 2nd conveyor (3), and which acts to the method of inside mutually (4), The 4th conveyor which acts to a left from the method of the right arranged ahead of the core of the 3rd conveyor (4) and which carries out on-off operation (5), The termination of the 5th conveyor (6) which acts from the method of the right formed successively by the left of this 4th conveyor (5) to a left, and this 5th conveyor (6) It connects with the start edge of the 1st conveyor (2). In the top face of the 5th conveyor (6) The temporal horn by the side of the fall of the container on the 5th conveyor, The fall base (7) constituted so that it may be made to fall without holding the superior horn by the side of a vertical angle, and barring the flow of contents is arranged. Chutes (8) are formed successively by the front edge of the 5th conveyor (6), and the balance section (9) which consisted of balance simple substances (9A) of an adequate several individual is arranged between the left part (2B) of the 1st conveyor (2), and the left part (3C) of the 2nd conveyor (3). The 1st hand plate (11) is prepared in the front face of the left part (2B) of the 1st conveyor (2) so that the container (10) on the 1st conveyor (2) concerned may be made to move onto **** of the balance section (9). The container on **** (10) is prepared in the 2nd hand plate (12) of migration **** on the inferior surface of tongue of the conveyance side of the 1st conveyor at the 2nd conveyor (3) top. The 2nd conveyor (3) is accompanied and it is in the opposite side of the 3rd conveyor (4), and it is prepared in the direction of the front free [an attitude] so that the container (10) on the 2nd conveyor (3) concerned may be moved on the 3rd conveyor (4). The 3rd hand plate (13) of ***** With the same number as the number of the containers (10) which participate in combination count, it is arranged at equal intervals according to the pitch of a container. To the 2nd conveyor (3) side The 4th hand plate (14) is arranged so that the selected container (10) on the top face of both the trailers that the 3rd conveyor simple substance (4A, 4B) of right and left of the 3rd conveyor (4) counters, and are approaching may be extruded on the 4th conveyor (5) to coincidence. By and the thing to establish for a control section-cum-the operation part (15) which can set up the measured value of each balance simple substance (9A) in the balance section (9), combination desired value, and tolerance, and can be displayed to these The measuring weight signal of each balance simple substance (9A) is memorized in order of a receipt and measuring. Each weight of all of the container of the adequate several individual located in a line on the 2nd conveyor (3) is memorized with the sequence located in a line. The metering installation characterized by being constituted so that a container may be chosen by extruding from from the 3rd hand plate (13) corresponding to the sequence of the combination which calculated the nearest combination and was chosen in the

combination of a predetermined individual among the these-memorized containers above setting weight.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] It is the process which starts the metering installation which realizes a measuring method and this measuring method concretely, and needs quantum measuring in detail, and although only measuring of this invention by the help was completed conventionally [, such as what to measure, with that to which especially a measured object tends to get damaged, the thing which puts again and dislikes fall, the thing which is easy to adhere, and directivity maintained,], it is suitable for processing.

[0002]

[Description of the Prior Art] It is the following if it is in this kind of thing conventionally. That is, combination automatic scale aiming at the conventional quantum measuring consist of 10-20 units for a multiple string parallel a radial or in the shape of a straight line to measure, and the one set section. Each unit may consist of a feed hopper for taking and sending timing to the feeder and balance part which supply a suitable amount sequentially from a top, and a scale hopper put on the balance, and the memory hopper stored temporarily after the scale hopper by the case may be formed. Each hopper delivered only the measured object by free fall one by one from the top, went by structure which a bottom opens and closes, calculated the weight combination of a scale hopper or a memory hopper, opened the selected hopper in coincidence, dropped it to the set section with a chute of a cone configuration, was collected in the center, dropped to the hopper or the conveyor, took timing, and was passing a measured object to the packaging machine of a back process.

[0003]

[Problem(s) to be Solved by the Invention] It had the following troubles, if it was in some which were stated by the Prior art.

1. In the conventional weigh machine , since free fall be perform the put substitute by the balance (precision be high at the point of convey and measure only a measuring object) , in what this be limit to the measure object on which it be easy to slide , and be easy to adhere , some measuring objects remained in each hopper and a chute , and since an error arose in calculated value and the actually discharged thing , it be immeasurable practically .
2. Moreover, what is easy to get damaged, the thing which is easy to break were immeasurable.
3. The process for fall with which a metering zone becomes scattering on the way, and keeps step again by arranging on the periphery around a discharge hopper at the radial at an outlet was required also for the thing which wants to arrange the sense.

[0004] 4. In combination measuring, in order to raise precision, naturally raising the precision of each balance needed to increase the number of combination otherwise but, therefore the balance was used 10-20 pieces, and the variation in a balance, a maintenance, and cost were also problems.

5. According to the number of reams of a balance, all parts, such as a feed zone hopper and a chute, are needed by each number of reams, and, in the case of food, wash the contact part of a measured object every day for health, but there are many components and an activity is serious.

6. In order big fall is needed on the whole in order to convey by natural fall, and to supply a raw material for measuring, the equipment which surely lifts a measured object was required of the last process, and the dedicated-device tooth space where head lining is high was required of the whole system.

[0005] 7. Conventionally Measured Elegance with which Flow of Measured Object Once Went into Balance for One-way Traffic [Bottom / from Top] For example, in order to reuse what needed to remove after the package and was removed before being discharged from a discharge hopper as a weight defective to a certain timing and going into a packaging machine, without the ability participating in combination or when going into one place too much too heavily The help was required and the pain of a raw material and the futility of a packaging material have occurred further.

8. The bottom which the measured object is moving has many moving parts, such as a preceding paragraph hopper, and the danger of some equipments being damaged and mixing in the measured object which is mainly food is high.

[0006] The place which this application is made in view of such a trouble that a Prior art has, and is made into the purpose tends to offer that whose following is possible. It supplies to a container in order with a feeder or helps, such as a feeder, and with a container, it moves in a flat-surface top, and in order, it can stock measuring, storage, and temporarily, a combination operation can be carried out out of this, and fall discharge can be carried out [the container of the optimal combination can be chosen, sampled and packed and].

[0007]

[Means for Solving the Problem] This invention is as follows in order to attain the above-mentioned purpose. That is, the 1st invention is measuring and a measuring method constituted so that a combination operation may be carried out and the container of the optimal combination may be chosen, sampled and packed, putting a measured object into a container for measuring, and moving it superficially with this container.

[0008] The 2nd conveyor 3 by which the 2nd invention acts on the method of the right from the left in which it was arranged in parallel to the 1st conveyor 2 which acts on a left from the method of the right, and the 1st conveyor 2, The 3rd conveyor 4 which consists of the 3rd conveyor simple substances 4A and 4B on either side which were arranged in parallel ahead of abbreviation front side one half partial 3D of the 2nd conveyor 3, and which act to the method of inside mutually, The 4th conveyor 5 which acts to a left from the method of the right arranged ahead of the core of the 3rd conveyor 4 and which carries out on-off operation, The termination of the 5th conveyor 6 which acts from the method of the right formed successively by the left of this 4th conveyor 5 to a left, and this 5th conveyor 6 It connects with the start edge of the 1st conveyor 2. In the top face of the 5th conveyor 6 The temporal horn by the side of the fall of the container on the 5th conveyor, The fall base 7 constituted so that it may be made to fall without holding the superior horn by the side of a vertical angle, and barring the flow of contents is arranged. Chutes 8 are formed successively by the front edge of the 5th conveyor 6, and the balance section 9 which consisted of balance simple substance 9A of an adequate several individual is arranged between left partial 3C of left partial 2B of the 1st conveyor 2, and the 2nd conveyor 3. The 1st hand plate 11 is formed in the front face of left partial 2B of the 1st conveyor 2 so that the container 10 on the 1st conveyor 2 concerned may be made to move onto **** of the balance section 9. The container 10 on **** is formed in the 2nd hand plate 12 of migration **** on the inferior surface of tongue of the conveyance side of the 1st conveyor at the 2nd conveyor 3 top. The 2nd conveyor 3 is accompanied and it is in the opposite side of the 3rd conveyor 4, and it is prepared in the direction of the front free [an attitude] so that the container 10 on the 2nd conveyor 3 concerned may be moved on the 3rd conveyor 4. The 3rd hand plate 13 of ***** With the same number as the number of the containers 10 which participate in combination count, it is arranged at equal intervals according to the pitch of a container. To the 2nd conveyor 3 side The 4th hand plate 14 is arranged so that the selected container 10 on the top face of both the trailers that the 3rd conveyor simple substances 4A and 4B of right and left of the 3rd conveyor 4 counter, and are approaching may be extruded on the 4th conveyor 5 to coincidence. By and the thing to establish for a control section-cum-the

operation part 15 which can set up the measured value of each balance simple substance 9A in the balance section 9, combination desired value, and tolerance, and can be displayed to these. Memorize the measuring weight signal of each balance simple substance 9A in order of a receipt and measuring, and each weight of all of the container of the adequate several individual located in a line on the 2nd conveyor 3 is memorized with the sequence located in a line. It is the metering installation constituted so that a container may be chosen by extruding from from the 3rd hand plate 13 corresponding to the sequence of the combination which calculated the nearest combination and was chosen in the combination of a predetermined individual among the these-memorized containers above setting weight.

[0009]

[Function]

1. Carry out the sequential injection of the measured object at the empty container 10 arranged in on the 1st conveyor 2.
2. the container which was stopped by stopper 2A and collected on it is the same as the number of balance simple substance 9A in the balance section 9 from a stopper side -- ** -- ride on balance simple substance 9A by the 1st hand plate 11 simultaneously, measure, and send a weight signal to a control section-cum-the operation part 15.
3. The container on the balance section moves to the 2nd conveyor 3 at actuation and coincidence of the above 2.
4. In the 1st conveyor 2, the 2nd conveyor 3 rotates towards hard flow, and will always be in the condition of having arranged 16 pieces in one train, one by one in the condition that a container is pushed against stopper 3B. By a control section-cum-the operation part 15, the combination heavier [than setting weight] and nearest in the combination of a container (1-4piece) is calculated from this inside, a selection signal is told to a control section-cum-the operation part 15, a selection cylinder is operated, and the selected container is extruded on the 3rd conveyor 4. the 4th conveyor 5 which the 3rd conveyor simple substances 4A and 4B of the right and left which constitute the 3rd conveyor 4 bring near an each container in the center first here, and carries out on-off operation by the 4th hand plate 14 -- delivery -- it is further sent to the 5th conveyor 6.

[0010] 5. On the 5th conveyor 6, a container is lifted by the fall base 7 from the 5th conveyor, fall on a near side, and only a measured object moves to chute 8. That is, although it is constituted so that the fall base 7 may use D point as the supporting point and 90 degrees or more may rotate, the condition that 120 degrees is rotating by a diagram is shown. What is easy to get damaged is discharged so that even about 120 degrees may be rotated slowly and it may let contents slide, and 150 degrees - 180 degrees rotate, the quick stop of what is easy to adhere is carried out shockingly termination, and as it pulls apart a container and contents, it discharges them.

6. Make return and the 1st conveyor 2 move a container to the 5th conveyor 6 again.
7. Container into which it Failed to Put Measured Object when Arranging on 1st Conveyor 2, and Container Which Cannot Participate in Fixed Time Amount Combination in 2nd Conveyor 3 Although 1-4 pieces are collectively moved from the 2nd conveyor 3 with the 3rd conveyor 4, the 4th conveyor 5, and the 5th conveyor 6 to the same timing as the usual combination, it is returned to the 1st conveyor 2, without upsetting the fall base 7, a measured object is adjusted, and it is measured again.

[0011]

[Example] while the measuring method as the 1st invention puts a measured object into a container for measuring and is made to move it superficially with this container -- measuring -- a combination operation is carried out, and it is constituted so that the container of the optimal combination may be chosen, sampled and packed. 1 is a metering installation as the 2nd invention. Since 2 is the 1st conveyor which acts on a left from the method of the right, stopper 2A doubled with the location of below-mentioned **** 9 is prepared in the top-face left edge of the 1st conveyor 2 concerned and a container stagnates in stopper 2A on a conveyor, in order to make friction small, the belt of the conveyor concerned consists of the quality of the materials on which a front face tends to slide. The belt of this 2nd conveyor consisted of the

quality of the materials on which it is easy to slide, 3 is the 2nd conveyor which acts on the method of the right from the left arranged in parallel to the 1st conveyor 2, it is lower than **** of the balance section 9, and the 3rd hand-plate 13 side of the after-mentioned has fallen for a while so that it may become high toward the 3rd conveyor 4 side of the after-mentioned. Guide 3A is prepared in this the side which fell, and it is constituted so that a container may not shift. Stopper 3B is prepared in top-face ***** of the belt of the 2nd conveyor 3.

[0012] 4 is the 3rd conveyor which consists of the 3rd conveyor simple substances 4A and 4B on either side which were arranged in parallel ahead of abbreviation front side one half partial 3D of the 2nd conveyor 3, and which act to the method of inside mutually. This 3rd conveyor 4 It is in a location lower than extension of the 4th hand plate 14 of the after-mentioned drawn in the inferior surface of tongue of the 2nd conveyor 3, and the 3rd conveyor simple substances 4A and 4B are the same rates, and they are constituted so that it may operate towards the inner direction. Consequently, the containers collected with the 3rd conveyor simple substances 4A and 4B by the same slipping easy will be collected in the center almost equally centering on that juncture irrespective of that number. 5 is the 4th conveyor which acts to a left from the method of the right arranged ahead of the core of the 3rd conveyor 4 and which carries out on-off operation.

[0013] 6 is the 5th conveyor which acts from the method of the right formed successively by the left of this 4th conveyor 5 to a left, can stop a container within the limits of the fall base 7 by 5th conveyor 6 which attached and made the container detector the outlet, narrows conveyance width, and it is constituted so that the fall base 7 can be installed in the container bottom. And the termination of this 5th conveyor 6 is connected with the start edge of the 1st conveyor 2. That is, the container on the 5th conveyor 6 can change on the 1st conveyor 2. Then, this fall base 7 is arranged in the top face of this 5th conveyor 6, and it is constituted so that it may be made to fall without holding the temporal horn by the side of the fall of a container, and the superior horn by the side of a vertical angle, and barring the flow of contents. This fall base 7 is constituted so that 90 degrees or more may rotate by using D point as the supporting point. 8 is the chute formed successively by the front edge of the 5th conveyor 6.

[0014] 9 is the balance section which consisted of balance simple substance 9A of the adequate several individual (illustration three pieces) arranged between left partial 3C of left partial 2B of the 1st conveyor 2, and the 2nd conveyor 3, and suits the pitch of the 1st hand plate 11 mentioned later. It is in a location somewhat lower than the 1st conveyor 2. Then, the 1st hand plate 11 is formed in the cross direction free [an attitude] so that the front face of left partial 2B of the 1st conveyor 2 may be made to move the container 10 on the 1st conveyor 2 concerned onto **** of the balance section 9. Slot 11A doubled with balance spacing of spacing somewhat larger than a container pitch is formed in the part which hits a container at this 1st hand plate, and opening a clearance between containers, it is constituted so that it may be made to move onto the balance section 9. 12 is the 2nd hand plate which was able to form the container 10 on **** in the inferior surface of tongue of the conveyance side of this 1st conveyor free [the attitude to the method cross direction of migration ****] on the 2nd conveyor 3, and this inferior surface of tongue will move the upper part of the balance section 9, and will extrude the container 10 on the balance section on the 2nd conveyor 3.

[0015] 13 accompanies the 2nd conveyor 3, is in the opposite side of the 3rd conveyor 4, it is prepared in the direction of the front free [an attitude], and it is the 3rd hand plate of *****, is the same number as the number of the containers 10 which participate in combination count, and is arranged in at equal intervals according to the pitch of a container so that the container 10 on the 2nd conveyor 3 concerned may be moved on the 3rd conveyor 4. 14 is the 4th hand plate currently arranged free [the attitude to the direction of the front] so that the container 10 on the top face of both the trailers that the 3rd conveyor simple substances 4A and 4B of right and left of the 3rd conveyor 4 counter the inferior surface of tongue of the conveyance side in the 2nd conveyor 3, and are approaching it may be extruded on the 4th conveyor 5 to coincidence by four pieces.

[0016] It is a control section-cum-the operation part which 15 can set up the measured value of each balance simple substance 9A in the balance section 9, combination desired value, and

tolerance, and can be displayed. Memorize the measuring weight signal of each balance simple substance 9A in order of a receipt and measuring, and each weight of all of the container located in a line on the 2nd conveyor 3 is memorized with the sequence located in a line. For example, the nearest combination is calculated in the combination of 1-4 pieces above setting weight out of 16 pieces which were previously memorized among the containers located in a line 16 or more pieces in the case of the combination of 16 pieces. A container is chosen by extruding the 3rd hand plate 13 corresponding to the sequence of this selected combination.

[0017] This number of combination is $1+16C2+16C3+16C4$ 16 C. It becomes, and when it calculates, there is selection of $16+120+560+1820=2516$ kind. Furthermore, if the range which in the case of combination short weight combines discharge of the fall base 7 so that one measuring may be carried out by 2 times is extended, it will become selection of $16C5+16C6+16C7+16C8+2516=4368+8008+11440+12870+2516=39202$ kind. For this reason, even if it varies in the range where the weight supplied to the container is large, it can respond enough, but if measuring capacity is considered practically, the amount of supply will be adjusted so that it may become the combination of four or less pieces at the time of usual.

[0018] With reference to drawing 6, it explains more concretely. In this case, combination target weight is set to 10g, and the figure filled in in the container 10 shows the weight (g) of a measured object. In the case of the 1st cycle, since the container in which the measured object (3g, 5g, and 2g) is contained among the containers 10 located in a line on the 2nd conveyor 3 is set to a total of 10g, it will be chosen and will extrude by the 3rd hand plate 13. In the case of the 2nd cycle, since the container in which the measured object (4g, 2g, and 4g) is contained among the containers 10 located in a line on the 2nd conveyor 3 is set to a total of 10g, it will be chosen and will extrude by the 3rd hand plate 13. In the case of the 3rd cycle, since the container in which the measured object (2g, 3g, 3g, and 2g) is contained among the containers 10 located in a line on the 2nd conveyor 3 is set to a total of 10g, it will be chosen and will extrude by the 3rd hand plate 13.

[0019]

[Effect of the Invention] Since this invention is constituted as above-mentioned, it does so the effectiveness indicated below. A measured object is fed into a container in order with a feeder or helps, such as a feeder, with a container, in order, it can stock measuring, storage, and temporarily and a combination operation can be carried out out of this, the container of the optimal combination can be chosen, sampled and packed and fall discharge can be carried out. That is, in this case, it is in the middle of 1. measuring, and puts again, and there is no fall, and in order for the container which the blemish of a measured object and a crack are the minimum slipping or in order to roll, and was chosen to stick also at the time of discharge and to carry out a coincidence fall in the same direction, the sense of a measured object gathers and is discharged by the narrow range.

2. Although the number of balance simple substances is determined by a combination measuring rate and the speed of stability of a balance, it is 1 – some, and the cause of an error decreases and a maintenance and cost are also advantageous.

3. In order to raise precision, also when increasing combination, it becomes highly precise by the minimum investment that what is necessary is just to extend the 3rd hand plate 13, without increasing a balance. Since the balance section only fills up a part for the container combined and chosen, in order to raise a system accuracy originally, it is not required to increase the number of a balance simple substance.

[0020] 4. It is only the container of simple structure which a measured object contacts, and since the feeder of number of balances only increases also in the case of automatic supply, washing etc. is easy and the activity after termination becomes easy.

5. Since a conveyance path moves on a flat surface, the difference of elevation of supply and discharge is not produced and there is nothing that does not need the device space where head lining of dedication is high, and moves by the container bottom, there is little possibility of foreign matter mixing.

6. For example, the container of the weight which enters too much and cannot participate in combination is selected collectively, adjusts return and an amount to a feed zone, without

making it fall in the discharge section, and measures them again, and the futility of a raw material and materials of it is lost by participating in combination.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the whole perspective view.

[Drawing 2] It is an A-A line expanded sectional view.

[Drawing 3] It is a B-B line expanded sectional view.

[Drawing 4] It is an important section expanded sectional view in a C-C line.

[Drawing 5] It is a block diagram.

[Drawing 6] It is the schematic-drawing-top view which explains an operation of a control section-cum-operation part in order.

[Description of Notations]

1 Metering Installation

2 1st Conveyor

2A Stopper

2B The left part of the 1st conveyor

3 2nd Conveyor

3A Guide

3B Stopper

3C The left part of the 2nd conveyor

3D The abbreviation front side one half part of the 2nd conveyor

4 3rd Conveyor

4A, 4B The 3rd conveyor simple substance

5 4th Conveyor

6 5th Conveyor

7 Fall Base

8 Chute

9 Balance Section

9A Balance simple substance

10 Container

11 1st Hand Plate

11A Slot

12 2nd Hand Plate

13 3rd Hand Plate

14 4th Hand Plate

15 Control Section-cum-Operation Part

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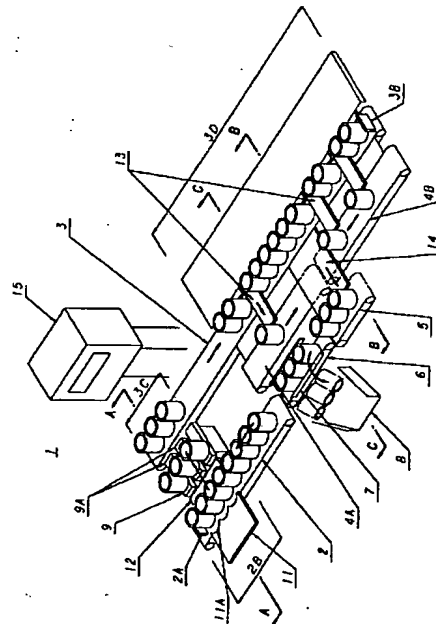
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(54) 【発明の名称】 計量方法と計量装置

(57) 【要約】

【目的】 計量途中で乗せ替え、落下がなく、排出時も滑り又は転がるため、被計量物の傷、割れは最小限であり、被計量物の向きがそろって排出することができるなどの効果を有する計量方法と計量装置の提供を目的とする。

【構成】 前者は被計量物を入れた容器のまま平面的に移動させながら計量や組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめるよう構成されている。後者は被計量物を順に投入した容器のまま適数個をコンベヤ移動させながら制御部兼演算部によって、これら容器について計量、記憶、一時ストックし、この中から組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめて転倒排出することができるよう構成されている。



【特許請求の範囲】

【請求項1】 被計量物を計量のため容器に入れ、この容器のまま平面的に移動させながら計量や組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめるよう構成されていることを特徴とする計量方法。

【請求項2】 右方から左方に作用する第1コンベア

(2)と、第1コンベア(2)に対して平行に配設された左方から右方に作用する第2コンベア(3)と、第2コンベア(3)の略前方側半分部分(3D)の前方に平行に配設された互いに内方へ作用する左右の第3コンベア単体(4A、4B)からなる第3コンベア(4)と、第3コンベア(4)の中心部の前方に配設された右方から左方へ作用する間欠運転する第4コンベア(5)と、この第4コンベア(5)の左方に連設された右方から左方へ作用する第5コンベア(6)と、この第5コンベア(6)の終端は、第1コンベア(2)の始端と連結され、第5コンベア(6)の上面には第5コンベア上の容器の転倒側の下角と、対角側の上角を保持して内容物の流れを妨げずに転倒させるよう構成されている転倒台

(7)が配設され、第5コンベア(6)の前面縁にはシュート(8)が連設され、第1コンベア(2)の左方部分(2B)と第2コンベア(3)の左方部分(3C)間には適数個の秤単体(9A)から構成された秤部(9)が配設され、第1コンベア(2)の左方部分(2B)の前面には当該第1コンベア(2)上の容器(10)を秤部(9)の秤面上に移動せしめるよう第1押板(11)が設けられ、第1コンベアの搬送面の下面に秤部上の容器(10)を第2コンベア(3)上に移動せる第2押板(12)が設けられ、第2コンベア(3)に添って第3コンベア(4)の反対側にあり、当該第2コンベア

(3)上の容器(10)を第3コンベア(4)上に移動させるよう前方方向に進退自在に設けられ適数枚の第3押板(13)は、組み合わせ計算に参加する容器(10)の数と同じ数で、容器のピッチに合わせて等間隔に並べられ、第2コンベア(3)側には、第3コンベア

(4)の左右の第3コンベア単体(4A、4B)の対向して接近している両終端部の上面にある選択された容器(10)を同時に第4コンベア(5)上に押し出すよう第4押板(14)が配設され、かつ、これらに対して秤部(9)における各秤単体(9A)の計量値と、組み合わせ目標値、許容範囲を設定、表示できる制御部兼演算部(15)を設けることで、各秤単体(9A)の計量重量信号を受取り、計量順に記憶していき、第2コンベア(3)上に並んでいる適数個の容器の各々の重量は全て並んでいる順番と共に記憶され、これら記憶された容器のうちから、所定個の組合せで設定重量以上で最も近い組合せを計算し、選択された組合せの順番に対応した第3押板(13)を押し出すことにより容器を選択するよう構成されていることを特徴とする計量装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、計量方法とこの計量方法を具体的に実現する計量装置に係るものであり、詳しくは定量計量を必要とする工程で、特に被計量物が傷つきやすいもの、乗せ替え、落下を嫌うもの、付着しやすいもの、方向性を保ったまま計量したいものなど従来人手による計量しかできなかったものの処理に好適なものである。

【0002】

10 【従来の技術】従来、この種のものにあつては、下記のようなものになっている。すなわち、従来の定量計量を目的とした組合せ自動秤は、放射状または直線状に並列な多連の計量するための10～20個のユニット及び、1個の集合部から構成されている。各ユニットは、上から順に適当量を供給するフィーダー、秤部分へタイミングをとって送るための供給ホッパー、秤に載せられている計量ホッパーで構成され、場合により計量ホッパーの後に一時記憶しておくメモリーホッパーが設けられることもある。各ホッパーは底が開閉する構造で被計量物のみを上から順次自由落下により受け渡して行き、計量ホッパー又はメモリーホッパーの重量組合せを計算し、選択されたホッパーを同時に開け、円錐形状のシュートをもつ集合部に落とし、中央に集め、ホッパー又はコンベアに落とし、タイミングをとって後工程の包装機へ被計量物を渡していた。

【0003】

【発明が解決しようとする課題】従来の技術で述べたものにあつては、下記のような問題点を有していた。

1. 従来の計量機では、自由落下により秤への乗せ替えを行っているため(計量物のみを搬送、計量するという点では、精度が高いのだが)、これは、滑りやすい被計量物に限定され、付着しやすいものでは、各ホッパー、シュートに計量物の一部が残り、計算値と実際排出されたものとに誤差が生じるため、実用上、計量できなかった。

2. 又、傷つきやすいもの、割れやすいもの等は計量不可であった。

3. 向きを揃えたいものも落差のためと、計量部が排出ホッパーの周囲の円周上に放射状に配置してあることにより、途中でバラバラになって、出口で再度揃える工程が必要であった。

【0004】4. 組合せ計量の場合、精度を上げるためには個々の秤の精度を上げるのは当然だが、他に組合せの数を増やすことが必要であり、そのため、秤を10～20ヶ使用しており、秤のバラツキ、メンテナンス、コストも問題であった。

5. 秤の連数に合わせて供給部ホッパー、シュートなど全ての部分が各連数分必要となり、食品の場合は衛生のため毎日被計量物の接触部分を洗浄しているが、部品が多く作業が大変である。

6. 自然落下により搬送するため、全体では大きな落差が必要となり、計量のため、原料を供給するためには前工程で必ず被計量物を持ち上げる装置が必要であり、全体システムでは天井の高い専用装置スペースが必要であった。

【0005】7. 従来被計量物の流れは上から下に一方通行のため、一旦秤に入った被計量物は、例えば一カ所に過重に入りすぎた場合等に、組合せに参加できずに、あるタイミングで排出ホッパーから重量不良品として排出され包装機に入る前、又は包装後に取り除く必要があり、取り除いたものを再利用するために、人手を要し、更に、原料のいたみ、包装資材の無駄が発生している。

8. 被計量物が移動している上側に前段ホッパー等の運動部分が多く、装置の一部が破損する可能性もあり、主に食品である被計量物に混入する危険性が高い。

【0006】本願は、従来の技術の有するこのような問題点を鑑みなされたものであり、その目的とするところは、次のような事のできるものを提供しようとするものである。フィーダー等の供給装置又は人手で容器に順に投入し、容器のまま平面上を移動し、順に、計量、記憶、一時ストックし、この中から組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめて転倒排出することができる。

【0007】

【課題を解決するための手段】上記目的を達成するために、本発明は下記のようなものである。すなわち、第1発明は、被計量物を計量のため容器に入れ、この容器のまま平面的に移動させながら計量や組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめるよう構成されている計量方法である。

【0008】第2発明は、右方から左方に作用する第1コンベア2と、第1コンベア2に対して平行に配設された左方から右方に作用する第2コンベア3と、第2コンベア3の略前方側半分部分3Dの前方に平行に配設された互いに内方へ作用する左右の第3コンベア単体4A、4Bからなる第3コンベア4と、第3コンベア4の中心部の前方に配設された右方から左方へ作用する間欠運転する第4コンベア5と、この第4コンベア5の左方に連設された右方から左方へ作用する第5コンベア6と、この第5コンベア6の終端は、第1コンベア2の始端と連結され、第5コンベア6の上面には第5コンベア上の容器の転倒側の下角と、対角側の上角を保持して内容物の流れを妨げずに転倒させるよう構成されている転倒台7が配設され、第5コンベア6の前面縁にはシュート8が連設され、第1コンベア2の左方部分2Bと第2コンベア3の左方部分3C間には適数個の秤単体9Aから構成された秤部9が配設され、第1コンベア2の左方部分2Bの前面には当該第1コンベア2上の容器10を秤部9の秤面上に移動せしめるよう第1押板11が設けられ、第1コンベアの搬送面の下面に秤部上の容器10を第2

コンベア3上に移動せる第2押板12が設けられ、第2コンベア3に添って第3コンベア4の反対側にあり、当該第2コンベア3上の容器10を第3コンベア4上に移動させるよう前方方向に進退自在に設けられ適数枚の第3押板13は、組み合わせ計算に参加する容器10の数と同じ数で、容器のピッチに合わせて等間隔に並べられ、第2コンベア3側には、第3コンベア4の左右の第3コンベア単体4A、4Bの対向して接近している両終端部の上面にある選択された容器10を同時に第4コンベア5上に押し出すよう第4押板14が配設され、かつ、これらに対して秤部9における各秤単体9Aの計量値と、組合せ目標値、許容範囲を設定、表示できる制御部兼演算部15を設けることで、各秤単体9Aの計量重量信号を受取り、計量順に記憶していき、第2コンベア3上に並んでいる適数個の容器の各々の重量は全て並んでいる順番と共に記憶され、これら記憶された容器のうちから、所定個の組合せで設定重量以上で最も近い組合せを計算し、選択された組合せの順番に対応した第3押板13を押し出すことにより容器を選択するよう構成されている計量装置である。

【0009】

【作用】

1. 第1コンベア2上に並べられた空の容器10に被計量物を順次投入する。

2. ストッパー2Aに止められて溜った容器は、ストッパー側から秤部9における秤単体9Aの数と同じだけ同時に第1押板11により秤単体9A上へ乗り、計量し、制御部兼演算部15に重量信号を送る。

3. 上記2の動作と同時に秤部上の容器は第2コンベア3に移る。

4. 第2コンベア3は常時第1コンベア2とは逆方向に向けて回転し、ストッパー3Bに容器は押しつけられる状態で、順次1列に16ヶ並べた状態となる。制御部兼演算部15で、この中から1～4ヶの容器の組合せで設定重量より重くて、最も近い組合せを計算し、選択信号を制御部兼演算部15に伝え、選択シリンダーを作動させ、選択された容器を第3コンベア4上に押し出す。ここで、第3コンベア4を構成する左右の第3コンベア単体4A、4Bは各々容器をまず中央に寄せ、第4押板14にて、間欠運転する第4コンベア5に送り、さらに第5コンベア6に送られる。

【0010】5. 第5コンベア6上では、転倒台7により容器は第5コンベアから持ち上げられ手前側に倒れ、被計量物のみシュート8に移る。すなわち、転倒台7はD点を支点として90°以上回転するよう構成されているが、図では120°回転している状態を示している。傷つきやすいものは、ゆっくり120°位まで回転し内容物を滑らせるように排出し、付着しやすいものは150°～180°回転し、終端で衝撃的に急停止させ容器と内容物を引き離すようにして排出する。

6. 容器はまた第5コンベア6に戻り、第1コンベア2に移動せしめることになる。

7. 第1コンベア2に並べる際に被計量物を入れ漏らした容器や、第2コンベア3において一定時間組合せに参加できない容器は、1~4個まとめて通常の組合せと同じタイミングで、第2コンベア3から第3コンベア4、第4コンベア5、第5コンベア6と移動するが、転倒台7を転倒させずに第1コンベア2に戻され、被計量物を加減し再び計量される。

【0011】

【実施例】第1発明としての計量方法は、被計量物を計量のため容器に入れ、この容器のまま平面的に移動させながら計量や組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめるよう構成されている。1は第2発明としての計量装置である。2は右方から左方に作用する第1コンベアで、当該第1コンベア2の上面左方端には後述秤部9の位置に合わせたストッパー2Aが設けられ、コンベア上でストッパー2Aにて容器が停滞するので、摩擦を小さくするため、当該コンベアのベルトは表面が滑りやすい材質で構成されている。3は第1コンベア2に対して平行に配設された左方から右方に作用する第2コンベアで、この第2コンベアのベルトは滑りやすい材質で構成され、秤部9の秤面より低く、後述第3コンベア4側に向かって高くなるように少し後述第3押板13側が下がっている。この下がった側にガイド3Aを設け、容器がずれないように構成されている。第2コンベア3のベルトの上面右方端にはストッパー3Bが設けられている。

【0012】4は第2コンベア3の略前方側半分部分3Dの前方に平行に配設された互いに内方へ作用する左右の第3コンベア単体4A、4Bからなる第3コンベアで、この第3コンベア4は、第2コンベア3の下面に引き込まれている後述第4押板14の延長より低い位置にあり、第3コンベア単体4A、4Bは同じ速度で、内方へ向け作動するよう構成されている。この結果、同じ滑りやすさで第3コンベア単体4A、4Bで集められた容器は、その数にかかわらず、その合流点を中心にほぼ均等に中央に集められることになる。5は第3コンベア4の中心部の前方に配設された右方から左方へ作用する間欠運転する第4コンベアである。

【0013】6はこの第4コンベア5の左方に連設された右方から左方へ作用する第5コンベアで、出口に容器検出器を取付けた第5コンベア6で容器を転倒台7の範囲内で停止させることができ、搬送巾を狭くし、容器下側に転倒台7が設置できるように構成されている。そして、この第5コンベア6の終端は、第1コンベア2の始端と連結されている。すなわち、第5コンベア6上の容器は第1コンベア2上に乗り移ることができる。そこで、この転倒台7は、この第5コンベア6の上面に配設され、容器の転倒側の下角と、対角側の上角を保持して

内容物の流れを妨げずに転倒させるよう構成されている。この転倒台7はD点を支点として90°以上回転するよう構成されている。8は第5コンベア6の前面縁に連設されたシュートである。

【0014】9は第1コンベア2の左方部分2Bと第2コンベア3の左方部分3C間に配設された適数個（図示では3個）の秤単体9Aから構成された秤部で、後述する第1押板11のピッチに合っている。第1コンベア2より少し低い位置にある。そこで、第1コンベア2の左方部分2Bの前面には当該第1コンベア2上の容器10を秤部9の秤面上に移動せしめるよう第1押板11が前後方向へ進退自在に設けられている。この第1押板には容器に当たる部分に容器ピッチより少し広い間隔の秤間隔に合わせた溝11Aが形成され、容器間に隙間を開けながら秤部9の上に移動させるよう構成されている。12はこの第1コンベアの搬送面の下面に秤部上の容器10を第2コンベア3上に移動せるよう前後方向に進退自在に設けられた第2押板で、この下面は秤部9の上方を動き、秤部上の容器10を第2コンベア3に押し出すことになる。

【0015】13は第2コンベア3に添って第3コンベア4の反対側にあり、当該第2コンベア3上の容器10を第3コンベア4上に移動させるよう前方方向に進退自在に設けられ適数枚の第3押板で、組合せ計算に参加する容器10の数と同じ数で、容器のピッチに合わせて等間隔に並べてある。14は第2コンベア3における搬送面の下面に、第3コンベア4の左右の第3コンベア単体4A、4Bの対向して接近している両終端部の上面にある容器10を4個分同時に第4コンベア5上に押し出すよう前方方向へ進退自在に配設されている第4押板である。

【0016】15は秤部9における各秤単体9Aの計量値と、組合せ目標値、許容範囲を設定、表示できる制御部兼演算部で、各秤単体9Aの計量重量信号を受取り、計量順に記憶していき、第2コンベア3上に並んでいる容器の各々の重量は全て並んでいる順番と共に記憶され、例えば16個の組合せの場合、16個以上並んでいる容器のうち、先に記憶された16個の中から1~4個の組合せで設定重量以上で最も近い組合せを計算する。この選択された組合せの順番に対応した第3押板13を押し出すことにより容器を選択する。

【0017】この組合せ数は、 ${}_{16}C_1 + {}_{16}C_2 + {}_{16}C_3 + {}_{16}C_4$ となり、計算すると $16 + 120 + 560 + 1820 = 2516$ 通りの選択がある。さらに、組合せ重量不足の場合、転倒台7の排出を2回で1回の計量をするよう組合せの範囲をひろげると、 ${}_{16}C_1 + {}_{16}C_2 + {}_{16}C_3 + {}_{16}C_4 + 2516 = 4368 + 8008 + 11440 + 12870 + 2516 = 39202$ 通りの選択になる。このため、容器に投入した重量が広い範囲でばらついていても十分対応できるが、実用上計量能力を考

と、通常時4個以下の組合せになるように供給量を加減する。

【0018】図6を参照して、より具体的に説明する。この場合、組合せ目標重量は10gとし、容器10内に記入された数字は被計量物の重量(g)を示している。第1サイクルの場合では、第2コンベア3上に並んでいる容器10のうち、3g、5g、2gの被計量物が入っている容器が合計10gとなるので、選ばれて第3押板13で押し出されることになる。第2サイクルの場合では、第2コンベア3上に並んでいる容器10のうち、4g、2g、4gの被計量物が入っている容器が合計10gとなるので、選ばれて第3押板13で押し出されることになる。第3サイクルの場合では、第2コンベア3上に並んでいる容器10のうち、2g、3g、3g、2gの被計量物が入っている容器が合計10gとなるので、選ばれて第3押板13で押し出されることになる。

【0019】

【発明の効果】本発明は、上述の通り構成されているので次に記載する効果を奏する。フィーダー等の供給装置又は人手で被計量物を容器に順に投入し、容器のまま順に、計量、記憶、一時ストックし、この中から組合せ演算し、最適な組合せの容器を選択し、抜き取りまとめて転倒排出することができる。すなわち、この場合、

1. 計量途中で乗せ替え、落下がなく、排出時も滑り又は転がるため、被計量物の傷、割れは最小限であり、選択された容器は密着して同じ方向に同時転倒するため狭い範囲に被計量物の向きがそろって排出される。

2. 組合せ計量速度と、秤の安定の速さにより、秤単体の数が決定されるが、1～数個であり、誤差原因が少なくなり、メンテナンス、コストも有利である。

3. 精度を上げるために組合せを増やす場合も、秤を増やさずに、第3押板13を増設するだけでよく、最小投資で高精度になる。秤部は組み合わせ選択された容器分を補充するだけであるので、本来組合せ精度を上げるために秤単体の台数を増やすことは必要ではない。

【0020】4. 被計量物が接触するのはシンプルな構造の容器のみであり、自動供給の場合でもフィーダーが秤の数だけ増えるだけなので、洗浄等が容易であり、終了後の作業が簡単になる。

5. 搬送経路は平面上で移動するので、供給と排出の高

低差は生じないため、専用の天井の高い装置空間を必要としないし、容器の上側で動くものがないので、異物混入の可能性が少ない。

6. 例えば入りすぎたりして組合せに参加できない重量の容器は、まとめて選び出し、排出部で転倒させずに供給部に戻り、量を加減して再度計量し、組合せに参加することにより原料、資材の無駄がなくなる。

【図面の簡単な説明】

【図1】全体の斜視図である。

【図2】A-A線拡大断面図である。

【図3】B-B線拡大断面図である。

【図4】C-C線における要部拡大断面図である。

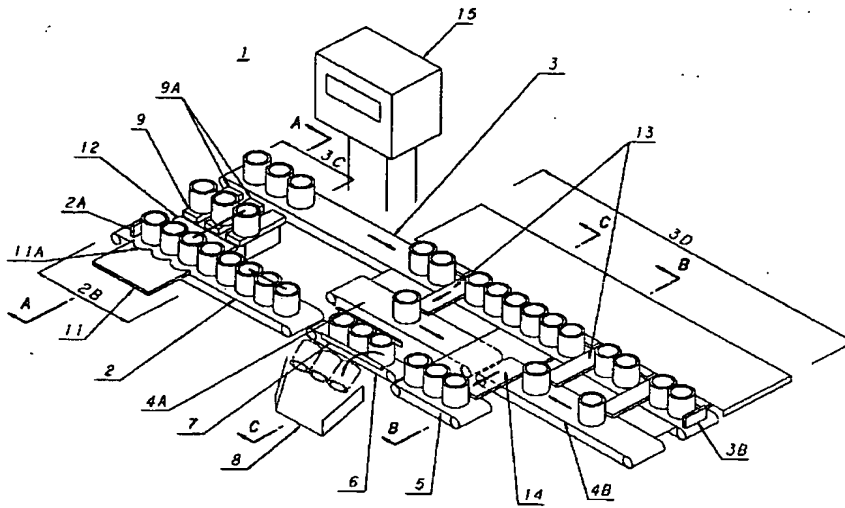
【図5】ブロック図である。

【図6】制御部兼演算部の作用を順に説明する略図的平面図である。

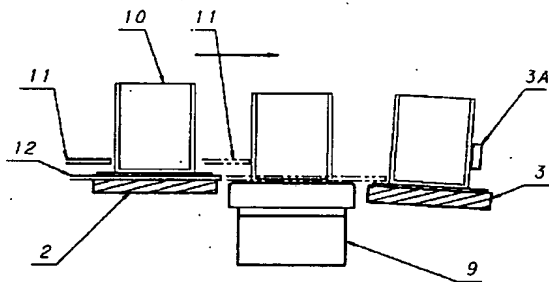
【符号の説明】

- 1 計量装置
- 2 第1コンベア
- 2A ストッパー
- 2B 第1コンベアの左方部分
- 3 第2コンベア
- 3A ガイド
- 3B ストッパー
- 3C 第2コンベアの左方部分
- 3D 第2コンベアの略前方側半分部分
- 4 第3コンベア
- 4A、4B 第3コンベア単体
- 5 第4コンベア
- 6 第5コンベア
- 7 転倒台
- 8 シュート
- 9 秤部
- 9A 秤単体
- 10 容器
- 11 第1押板
- 11A 溝
- 12 第2押板
- 13 第3押板
- 14 第4押板
- 15 制御部兼演算部

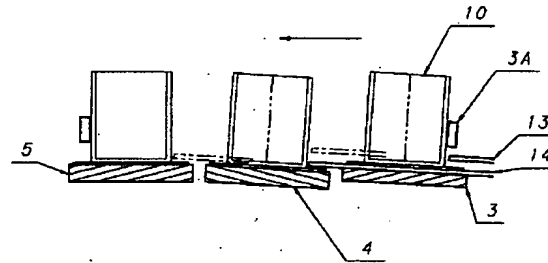
【図1】



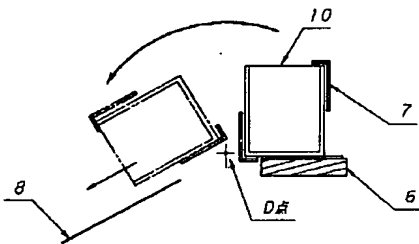
【図2】



【図3】



【図4】



【図5】

